



JC17 Rec'd PCT/PTO 03 MAY 2001

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TRANSMITTAL LETTER TO THE UNITED STATES
DESIGNATED/ELECTED OFFICE (DO/EO/US)
CONCERNING A FILING UNDER 35 U.S.C. 371



ATTORNEY'S DOCKET NO.

11001.075

U.S. APPLICATION NO.

097831390

INTERNATIONAL APPLICATION NO.

INTERNATIONAL FILING DATE

PRIORITY DATE CLAIMED

PCT/E99/00939

12 November 1999

16 November 1998

TITLE OF INVENTION

Doctor For A Suction Roll Particularly In Paper Machines

APPLICANT(S) FOR DO/EO/US

Tuomo Juvakka, Jouko Pussinen

Applicant herewith submits to the United States Designated Elected Office (DO/EO/US) the following items and other information.

1. ☒ This is a **FIRST** submission of items concerning a filing under 35 U.S.C. 371.
2. ☐ This is a **SECOND** or **SUBSEQUENT** submission of items concerning a filing under 35 U.S.C. 371.
3. ☐ This express request to begin national examination procedures (U.S.C. 371(f)) at any time rather than delay examination until the expiration of the applicable time limit set in U.S.C. 371(b) and PCT Articles 22 and 39
4. ☒ A proper Demand for International Preliminary Examination was made by the 19th month from the earliest claimed priority.
5. ☒ A copy of the International Application as filed (35 U.S.C. 37(c)(2))
 - a. ☐ is transmitted herewith (required only if not transmitted by the International Bureau)
 - b. ☒ has been transmitted by the International Bureau
 - c. ☐ is not required, as the application was filed in the United States Receiving Office (RO/US)
6. ☐ A translation of the International Application into English (35 U.S.C. 371(c)(2)).
7. ☒ Amendments to the claims of the International Application under PCT Article 19 (35 U.S.C. 371(c)(3))
 - a. ☐ are transmitted herewith (required only if not transmitted by the International Bureau).
 - b. ☒ have been transmitted by the International Bureau.
 - c. ☐ have not been made; however, the time limit for making such amendments has NOT expired.
 - d. ☐ have not been made and will not be made.
8. ☐ A translation of the amendments to the claims under PCT Article 19 (35 U.S.C. 371(c)(3)).
9. ☒ An oath or declaration of the inventor(s) (35 U.S.C. 371(c)(4)).
10. ☒ A translation of the annexes to the International Preliminary Examination Report under PCT Article 36 (35 U.S.C. 371(c)(5)).

Items 11. to 16. below concern other document(s) or information included:

11. ☒ An Information Disclosure Statement under 37 CFR 1.97 and 1.98.
12. ☒ An assignment document for recording. A separate cover sheet in compliance with 37 CFR 3.28 and 3.31 is included.
13. ☒ A **FIRST** preliminary amendment.
☐ A **SECOND** or **SUBSEQUENT** preliminary amendment.
14. ☐ A substitute specification.
15. ☐ A change of power of attorney and/or address letter.
16. ☐ Other items or information:

TO BE RECEIVED

CALCULATIONS

- 17.
- ☒
- The following fees are submitted.

| ENTER APPROPRIATE BASIC FEE AMOUNT = | | | | \$ 1000.00 |
|---|--------------|--------------|------------|--------------|
| Surcharge of \$ 130.00 for furnishing the oath or declaration later than <input type="checkbox"/> 20 <input type="checkbox"/> 30 months from the earliest claimed priority date (37 CFR 1.492(e)). | | | | \$ |
| Claims | Number Filed | Number Extra | Rate | |
| Total Claims | 4 - 20 = | 0 | x \$ 18.00 | \$ |
| Independent Claims | 1 - 3 = | 0 | x \$ 80.00 | \$ |
| Multiple dependent claim(s) (if applicable) | | | | \$ 270.00 |
| TOTAL OF ABOVE CALCULATIONS | | | | = \$ 1000.00 |
| Reduction by 1/2 for filing by small entity, if applicable. Verified Small Entity statement must also be filed. (Note 37 CFR 1.9 1.27 1.28) | | | | - \$ |
| SUBTOTAL | | | | = \$ 1000.00 |
| Processing fee of \$ 130.00 for furnishing the English translation later than the <input type="checkbox"/> 20 <input type="checkbox"/> 30 months from the earliest claimed priority date (37 CFR 1.492(f)). | | | | + \$ |
| TOTAL NATIONAL FEE | | | | = \$ 1000.00 |
| Fee for recording the enclosed assignment (37 CFR 1.21(h)). The assignment must be accompanied by an appropriate cover sheet (37 CFR 3.28. 3.31). \$ 40.00 per property | | | | + \$ 40.00 |
| TOTAL FEES ENCLOSED | | | | = \$ 1040.00 |

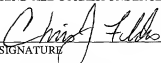
- a. ☒ A check in the amount of \$1040.00 to cover the above fees is enclosed.
- b. ☐ Please charge my Deposit Account No. _____ in the amount of \$ _____ to cover the above fees.
A duplicate copy of this sheet is enclosed.
- c. ☐ The Commissioner is hereby authorized to charge any additional fees which may be required, or credit any overpayment to Deposit Account No. _____. A duplicate copy of this sheet is enclosed.

NOTE: Where an appropriate time limit under 37 CFR 1.494 or 1.495 has not been met, a petition to revive (37 1.137 (a) or (b)) must be filed and granted to restore the application to pending status.

"Express Mail" mailing label No. E1041801933US
Date of Deposit: May 3, 2001

I hereby certify that this paper or fee is being deposited with the United States Postal Service "Express Mail Post Office to Addressee" service under 37 C.F.R. 1.10 on the date indicated above and is addressed to the Assistant Commissioner for Patents, Washington, D.C. 20231

SEND ALL CORRESPONDENCE TO:


SIGNATURE
Christopher J. Fildes
NAME
57452
REGISTRATION NUMBER

09/831390

JC08 Rec'd PCT/PTO 03 MAY 2001

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE
UNDER THE PATENT COOPERATION TREATY BEFORE THE
UNITED STATES DESIGNATED/ELECTED OFFICES

In regard to international application:

Serial No. PCT/FI99/00939
Applicants: Tuomo Juvakka et al.
Filing Date: November 12, 1999
Title: DOCTOR FOR A SUCTION ROLL PARTICULARLY
IN PAPER MACHINES
Attorney Docket No. 11001.075
To: Assistant Commissioner for Patents
Washington, D.C. 20231

I hereby certify that this correspondence is being deposited with the United States Postal Service as express mail in an envelope addressed to: Assistant Commissioner for Patents, Washington, D.C. 20231 on

May 3, 2001 Christopher J. Fildes
Date of Deposit Registered Attorney

Chris J. Fildes
Signature

PRELIMINARY AMENDMENT

Sir:

In connection with entry into the National Phase in the United States of the above referenced application, please amend the application as follows:

In the Specification:

- P. 1, line 2, insert the heading -- Technical Field --;
P. 1, line 10, insert the heading -- Background of the
Invention --;
P. 2, line 1, insert the heading -- Summary of the Invention
--;
P. 2, line 4, delete "The characteristic features of ...
Claims." and insert -- A doctor for removing water from a suction
roll in a paper machine includes a doctor slat fitted against the

surface of the suction roll extending essentially over the entire width of the suction roll, as well as its holder and loading devices. In the direction of the rotation of the suction roll, there is a doctor blade and a blade holder fitted to the doctor after the doctor slat and arranged to remove the water lifted off the suction roll by the doctor slat. The angle between the lines of contact of the doctor slat and the doctor blade in relation to the imagined axis of rotation of the suction roll is 15 - 70°, preferably 20 - 40°.

The doctor has a frame construction, to which holders of both the doctor slat and the doctor blade are fitted. The holder of the doctor slat is fitted detachably to the frame construction. The frame construction includes attachments corresponding to the blade holder of the doctor blade in the vicinity of the holder of the doctor slat.

P. 2, line 25, insert the heading -- Brief Description of the Drawings --;

P. 3, line 23, insert the heading -- Detailed Description of the Invention --;

P. 5, line 34, insert the paragraph -- Although the invention has been described by reference to specific embodiments, it should be understood that numerous changes may be made within the spirit and scope of the inventive concepts described. Accordingly, it is intended that the invention not be limited to the described embodiments, but that it have the full scope defined by the language of the following claims. --;

In the Claims:

Amend claims 1-4 as follows:

1. (Amended) A doctor for a suction roll particularly in a paper machine, which doctor [(10)] is intended to remove water from the suction roll [(15)] and which doctor [(10)] includes a doctor slat [(12)] fitted against the surface of the suction roll [(15)]

to extend essentially over the entire width of the suction roll [(15)], as well as its holder [(20)] and loading devices [(19)], [characterized] characterized in that, in the direction of the rotation of the suction roll [(15)], there is a doctor blade [(13)], which is as such known, with a blade holder [(21)] fitted to the doctor [(10)] after the doctor slat [(12)], arranged to remove the water lifted off the suction roll [(15)] by the doctor slat [(12)] and that the angle between the lines of contact of the doctor slat [(12)] and the doctor blade [(13)] in relation to the imagined axis of rotation of the suction roll [(15)] is 15 - 70°[, preferably 20 - 40°].


2. (Amended) A doctor according to Claim 1, [characterized] characterized in that the doctor [(10)] has a frame construction [(11)], to which the holders [(20, 21)] of both the doctor slat [(12)] and the doctor blade [(13)] are fitted.

3. (Amended) A doctor according to Claim 2, [characterized] characterized in that the holder [(20)] of the doctor slat [(12)] is fitted detachably to the frame construction [(11)].

4. (Amended) A doctor according to Claim 3, [characterized] characterized in that the frame construction [(11)] includes attachments corresponding to the blade holder [(21)] of the doctor blade [(13)] in the vicinity of the holder [(20)] of the doctor slat [(12)].

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Respectfully submitted,
Tuomo Juvakka et al.
Fildes & Outland, P.C.


Christopher J. Fildes, Attorney
Registration No. 32,132
20916 Mack Avenue, Suite 2
Grosse Pointe Woods, MI 48236
(313) 885-1500

ABSTRACT

- 5 A doctor for a suction roll in a paper machine is intended to remove water from a suction roll. The doctor includes a doctor slat fitted against the surface of suction roll extending essentially over the entire width of the suction roll, as well as the doctor slat holder and loading devices. In the direction
10 of rotation of the suction roll, there is a doctor blade, with a blade holder fitted to the doctor after the doctor slat. The doctor blade is arranged to remove the water lifted off the suction roll by the doctor slat.

PTO/PCT Rec'd 3 MAR 2001

DOCTOR FOR A SUCTION ROLL PARTICULARLY IN PAPER MACHINES

The present invention relates to a doctor for a suction roll particularly in paper machines, which doctor is intended to remove water from the suction roll, and which doctor includes a doctor slat arranged against the surface of the suction roll and essentially extending over the entire length of the suction roll, together with the doctor slat's retaining and loading members.

A suction roll doctor, which removes water from the suction roll, is known from FI patent application number 902910. The blade used in the doctor is a doctor slat, which scrapes the film of water off the surface of the suction roll. In addition, the doctor slat creates a suction zone behind itself, which also removes the water that has collected in the drill holes and grooves of the suction roll. Part of the water raised by the suction flows into a drainage tank beneath the suction roll, but the rotation of the suction roll causes part of the moisture to travel back into the felt or similar. This causes the web or felt to become soaked, or at least causes unevenness in the moisture profile of the web, felt, or paper.

A double doctor, in which an attempt has been made to improve the water removal capacity of the doctor by using two doctor blades, has also been manufactured for similar use. However, a conventional doctor blade cannot be used to achieve the suction effect of a doctor slat according to the invention, which can also suck the water out of the holes of the suction roll. In addition, doctor blades operate in the desired manner only over a certain part of the circumferential speed range of the suction roll. In this case, when the speed of the paper machine increases, both the water removal capacity of the doctor in question and the result of the doctoring diminish substantially.

The invention is intended to create a new kind of doctor for a suction roll particularly in paper machines, by means of which water can be removed from the suction roll more effectively than previously. The characteristic features of this invention are described in the accompanying Claims. The combination of a doctor according to the invention actualizes the advantageous properties of the doctor, in practice creating an excellent doctoring result. Simultaneously, a significant increase in the total solids content is achieved. Besides water, fibres and filler substances are also removed from the holes in the suction roll. This reduces the amount of loose material rotating with the suction roll and also helps the suction roll's holes to remain clean. The doctor also evens the humidity in the area around the suction roll, as most of the water is recovered in a controlled manner. Thus, the web, felt, or similar do not become soaked, instead an even moisture profile is maintained. A doctor according to the invention can be used in all suction roll positions. In addition, only small alterations are required to adapt the doctor to a very broad area of the suction roll's speed range.

In the following, the invention is described in detail with reference to the accompanying drawings, depicting some embodiments of the invention, in which drawings

Figure 1 shows side view of a doctor according to the invention,

Figure 2 shows a side view of a doctor according to the invention, as part of an arrangement for removing water, fitted to a suction roll.

The doctor according to the invention, shown in Figure 1, has two blades 12 and 13, which are fitted to the frame construction 11 of the doctor 10. Frame construction 11 is compact and is supported at both ends on bearings attached to the frame of the paper machine by means of adjustable supports 14. The frame

is shown by a dotted line. If necessary, doctor 10 can be turned away from the surface of the suction roll 15 by means of a turnbuckle 16 or similar. In Figure 1, turnbuckle 16 is fitted between a fixed bracket 17 and a supporting arm 18
5 attached to the turning frame construction 11. However, turnbuckle 16 is mainly only used to adjust the position of the doctor 10. Blades 12 and 13 are loaded and released by means of holders 20 and 21, which are equipped with conventional loading hoses 19 and 19'.

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In the operating position in Figure 1, blades 12 and 13 in doctor 10 act against the surface of suction roll 15, the actual suction sector being on the opposite side of suction roll 15. Suction roll 15, the holes or grooves in which are not
15 shown in the drawing, rotates in the direction shown by the arrow. The water removed by the first blade 12 in the direction of rotation of suction roll 15 is collected in a drainage tank beneath suction roll 15. The water collected by the second blade 13 is led to a trough 22 formed in the frame construction
20 11, where it does not interfere with the operation of the first blade 12. The water is then led from trough 22 to the drainage tank beneath suction roll 15.

According to the invention, a doctor blade 13, which is as such
25 known, is fitted to the doctor 10, behind the first blade 12, which in this case is a doctor slat, in the direction of rotation of suction roll 15. In the example, doctor blade 13 also includes a conventional blade holder 21 and loading hoses 19'. This blade combination gives a better doctoring result
30 than previously, especially when the circumferential speed of the suction roll is sufficiently high. In practice, the doctor slat 12 first removes the film of water from the suction roll 15 and then creates a suction effect after it. This so-called foil effect always arises when a suction roll rotates, but, as
35 is known, significant suction is only created once the circumferential speed of the suction roll rises to a certain

level. From this level onwards, the suction effect will usually increase, or at least remain the same. The foil effect sucks the water from the holes in the suction roll, which is then removed to trough 22 by doctor blade 13. Fibres and binders
5 also rise from the holes along with the water and are removed by doctor blade 13. A doctor according to the invention is so effective that the excess moisture does not rotate with the suction roll. Thus, the suction roll also functions more efficiently and re-wetting of the web or felt is eliminated.

10

Both doctor slat 12 and doctor blade 13 holders 20 and 21 are attached to the frame construction 11 of the doctor, allowing both blades 12 and 13 to be adjusted simultaneously in the doctor 10 installation. In addition, holders 20 and 21 are
15 adapted to the frame construction 11 in such a way that the angle α between the lines of contact of doctor slat 12 and doctor blade 13 in relation to the imagined axis of rotation of suction roll 15 is 15 - 70°. Preferably, angle α is 20 - 40°. Doctor blade 13 will then be able to move under the film of
20 water raised by doctor slat 12 and the water will not have time to be sucked back into the holes. In addition, thanks to blades 12 and 13 being set close to each other, the size of doctor 10 remains small. The doctor slat is preferably made from plastic.

25 The holder 20 of doctor slat 12 is arranged to be attached to the frame construction 11 of doctor 10 in such a way that it can be detached. In addition, frame construction 11 includes attachment devices (not shown), corresponding to blade holder 21 of doctor blade 13, in the vicinity of holder 20 of doctor
30 slat 12. Thus, the same doctor can also be used in paper machines that are classified as slow. In this case, it is justified to install a doctor according to the invention, equipped with a conventional doctor blade, in a paper machine, even though the machine is of a so-called slow type. This
35 allows the doctor to be rebuilt simply in future speed-raising projects, by replacing the normal blade, which has acted as the

first blade, with a doctor slat. The speed limit at which replacement is justified must be determined for individual cases. In principle, the suction effect of the doctor slat becomes significant, once the circumferential speed of the suction roll becomes sufficiently great.

To further improve the operation of the suction roll, it is preferable to arrange a doctor according to the invention as part of the arrangement shown in Figure 2. The same reference numbers are used for the functioning parts. The arrangement according to Figure 2 includes positive-pressure chamber 23, which is fitted inside suction roll 15 in the area of the doctor 10. Preferably, the positive-pressure chamber 23 is located between blades 12 and 13, immediately after blade 12 in the direction of rotation. The water-removing effect of the vacuum formed by doctor slat 12 is then reinforced by the positive pressure discharging from the holes. Positive-pressure chamber 23 terminates before the second blade, so that the operation of doctor blade 13 is not disturbed by the flow of air. The arrangement empties the holes of the suction roll more efficiently than before.

A suction roll doctor according to the invention can therefore be applied over a broad range of the circumferential speed of a suction roll, in all suction roll positions. In particular, the replacement of the doctor for different speed ranges is simple, which reduces costs. In practice, a significant increase in total solids content is achieved by using the doctor. When the doctoring result is good, the moisture profile after the suction roll is also more even, because the water that has once been sucked from the web or felt does not return to the web or felt. In this case, the veil of moisture surrounding the suction roll also becomes thinner.

12 -12- 2000

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CLAIMS

AMENDED

1. A doctor for a suction roll particularly in a paper machine,
which doctor (10) is intended to remove water from the suction
5 roll (15) and which doctor (10) includes a doctor slat (12)
fitted against the surface of the suction roll (15) to extend
essentially over the entire width of the suction roll (15), as
well as its holder (20) and loading devices (19), characterized
in that, in the direction of the rotation of the suction roll
10 (15), there is a doctor blade (13), which is as such known,
with a blade holder (21) fitted to the doctor (10) after the
doctor slat (12), arranged to remove the water lifted off the
suction roll (15) by the doctor slat (12) and that the angle
between the lines of contact of the doctor slat (12) and the
15 doctor blade (13) in relation to the imagined axis of rotation
of the suction roll (15) is 15 - 70°, preferably 20 - 40°.

2. A doctor according to Claim 1, characterized in that the
doctor (10) has a frame construction (11), to which the holders
20 (20, 21) of both the doctor slat (12) and the doctor blade (13)
are fitted.

3. A doctor according to Claim 2, characterized in that the
holder (20) of the doctor slat (12) is fitted detachably to the
25 frame construction (11).

4. A doctor according to Claim 3, characterized in that the
frame construction (11) includes attachments corresponding to
the blade holder (21) of the doctor blade (13) in the vicinity
30 of the holder (20) of the doctor slat (12).

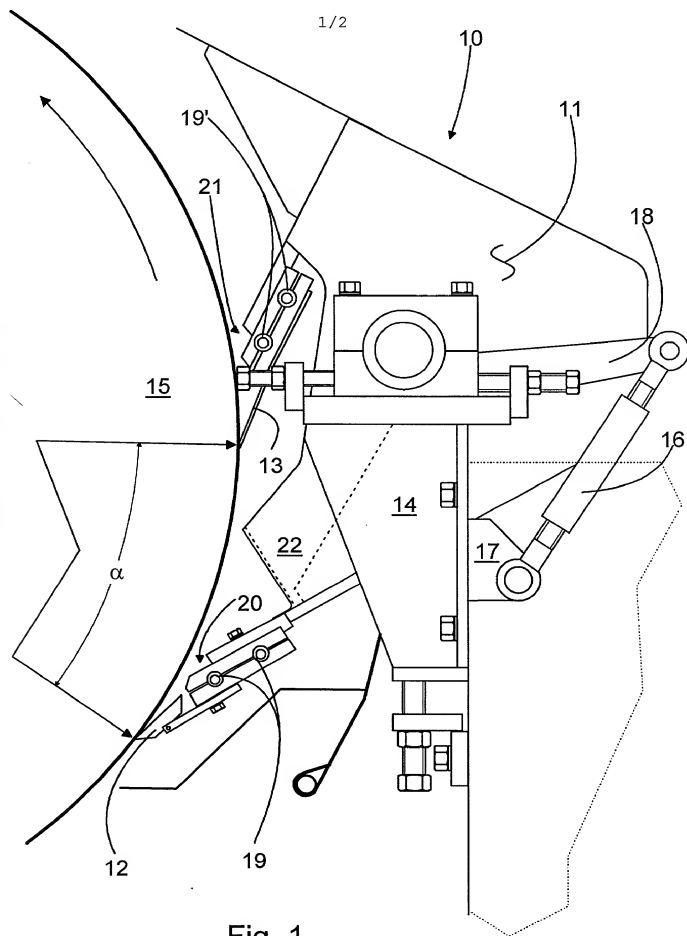


Fig. 1

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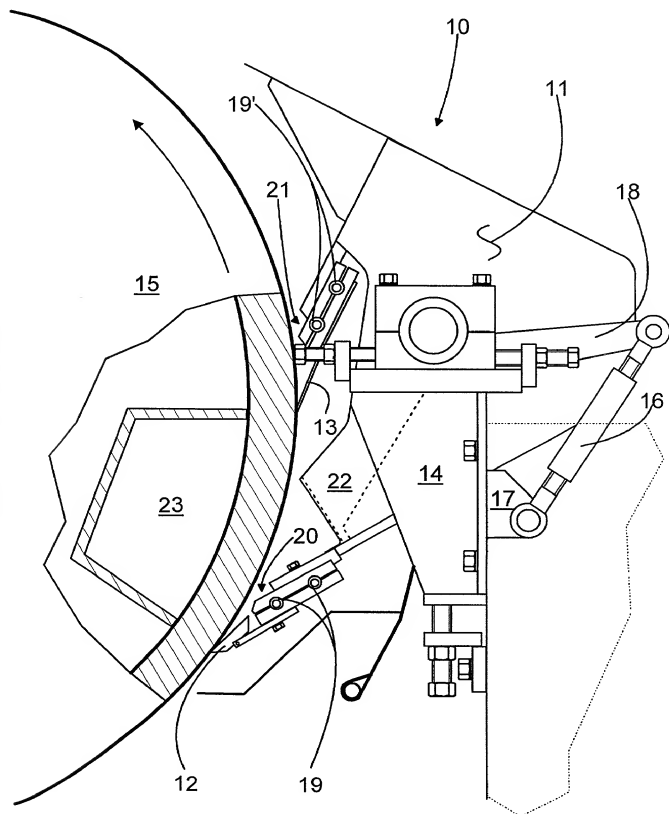


Fig. 2

DECLARATION FOR PATENT APPLICATION

As a below named inventor, I hereby declare that:
My residence, post office address and citizenship are as stated below next to my name.

I believe I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a patent is sought on the invention entitled Doctor For A Suction Roll Particularly In Paper Machines the specification of which

(check one) ☒ is attached hereto.

☐ was filed on _____; as Application Serial No. _____
and was amended on _____ (if applicable).

I hereby state that I have reviewed and understand the contents of the above identified specification, including the claims, as amended by any amendment referred to above.

I acknowledge the duty to disclose information which is material to the examination of this application in accordance with Title 37, Code of Federal Regulations, §1.56(a).

I hereby claim foreign priority benefits under Title 35, United States Code, §119 of any foreign application(s) for patent or inventor's certificate listed below and also identified below any foreign application for patent or inventor's certificate having a filing date before that of the application on which priority is claimed:

Prior Foreign Application(s):

Priority Claimed

| | | | |
|-----------------------------|-----------------------------|---|-----|
| <u>10980495</u> (Number) | <u>Finland</u> (Country) | <u>16/11/98</u> (Day/Month/Year Filed) | Yes |
| _____ (Number) | _____ (Country) | _____ (Day/Month/Year Filed) | |

I hereby claim the benefit under Title 35, United States Code, §120 of any United States application(s) listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in the prior United States application in the manner provided by the first paragraph of Title 35, United States Code, §112, I acknowledge the duty to disclose material information as defined in Title 37, Code of Federal Regulations, §1.56(a) which occurred between the filing date of the prior application and the national or PCT International filing date of this application:

| | | |
|---|----------------------------------|---|
| <u>PCT/E199/00939</u> (Application Serial No.) | <u>12/11/99</u> (Filing Date) | (Status - patented, pending, abandoned) |
| _____ (Application Serial No.) | _____ (Filing Date) | (Status - patented, pending, abandoned) |

I hereby appoint the following attorney(s) and/or agent(s) to prosecute this application and to transact all business in the Patent and Trademark Office connected therewith:

Christopher J. Fildes, Reg. No. 22,197; Robert J. Outland, Reg. No. 22,197
Edward P. Barthel, Reg. No. 20,717

Address all correspondence and telephone calls to Christopher J. Fildes
Fildes & Outland, P.C. 20916 Mack Avenue, Suite 2, Grosse Pointe Woods, Michigan 48236 - (313) 895-1500

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issued thereon.

Full name of sole or first inventor Tuomo Juvakka

Inventor's signature Tuomo Juvakka Date 4. 4. 2001

Post Office Address Same as residence Citizenship Finland

Residence Happasaarentie 2 H, FIN-60820 HAAPANIEMI, Finland

Full name of second joint inventor, if any Jouko Pussinen

Inventor's signature Jouko Pussinen Date 11. 4. 2001

Post Office Address Same as residence Citizenship Finland

Residence Ravimiehentie 10 as. 1, FIN-66800 ANJALANKOSKI, Finland